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A Review on Osmotic Drug Delivery System As A Part of Modified Release Dosage Form

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Abstract: *Osmotic drug delivery systems (ODDS) represent an advanced approach within modified-release dosage forms, designed to provide uniform and predictable drug release independent of physiological variables. These systems operate on the principle of osmotic pressure, utilizing osmogen-driven water influx through a semi-permeable membrane to achieve controlled and nearly zero-order drug delivery. ODDS offer several advantages over conventional and other controlled-release technologies, including minimized influence of gastrointestinal pH and motility, reduced food effects, and improved patient compliance through sustained therapeutic plasma concentrations. Various designs—such as elementary osmotic pumps, push–pull osmotic systems, controlled-porosity osmotic pumps, and multiparticulate osmotic formulations—enable tailored delivery of drugs with diverse physicochemical properties. Despite challenges such as manufacturing complexity and the requirement for specialized coating materials, osmotic systems continue to gain prominence in oral drug delivery due to their reliability, precision, and capability to enhance the efficacy and safety of therapeutic agents. This review highlights the principles, design considerations, advantages, limitations, and recent advancements in osmotic systems as a key component of modified-release dosage technology.*

Keywords: Osmosis, osmotic pressure. Zero order release, GI motility

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